A comparative study between *Pseudomonas fluorescens* biofilms formed under different flow regimes and cells in planktonic state

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A phenotypic comparative study between *P. fluorescens* cells developed in planktonic state and cells developed in biofilms formed under turbulent and laminar flow is presented. Cells were compared in terms of metabolic activity, number of cells *per* g of biological mass, amount of proteins and polysaccharides, expression of the outer membrane proteins (OMP) and analysis of the structural characteristics. The results obtained showed that cells in planktonic state look and behave significantly different from biofilm cells. Planktonic cells presented a more elongated structure, were more active, and had a much higher content of proteins and polysaccharides *per* cell than cells within biofilms. However, the number of cells *per* g of biological mass was much higher in biofilms. Cells developed in biofilms formed under turbulent flow presented a small size, higher metabolic activity, higher cell number and a small amount of proteins and polysaccharides *per* cell than cells from laminar biofilms. The OMP of biofilm cells was considerably different from their free cell counterparts. However, flow regime did not cause variation in cell OMP profiles. Because, profound differences were obtained between cells in different states, PCR experiments were followed in order to ascertain possible genotypic variance, being the DNA profiles similar for planktonic cells and cells within biofilms formed under turbulent and laminar flow regimes. This study revealed that biofilm formation under different flow regimes and the sessile mode of life itself trigger significant changes in *P. fluorescens* metabolism, morphology and biochemical composition, when comparing with the planktonic state. Also, this study provides new data concerning the phenotype characterization of biofilms grew under different hydrodynamic conditions.